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Comparison and optimisation of transfection of human dental follicle cells, a novel source of stem cells, with different chemical methods and electro-poration

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Abstract

Introduction Human dental follicle cells (HDFCs) derived from human impacted third molars (wisdom teeth) have been shown to be a significant source of adult stem cells. Generation of mesenchymal stem cell-like cells from dental follicles causes minimal surgical stress. In vitro and in vivo reports showed that HDFCs can be utilized in gene and cell therapy applications which make them an attractive alternative source for different gene-cell therapy applications. However, there are currently no systematic comparative studies on transfection potential of HDFC cells using different chemical and electro-poration techniques. Methods Stem cells from impacted third tooth molars were isolated, and analyzed for expression of surface markers. Transfection efficiencies of four commercially available transfection reagents (Transfast, Escort V, Superfect and FuGene HD) and electro-poration on isolated stem cells were compared. Results Isolated HDFCs were stained positive for CD105, CD90, CD73, CD166, and negative for CD34, CD45, and CD133. Among the chemical transfection reagents used in this study, FuGene HD was the most efficient in transfecting HDFCs, even in the presence of 10% serum. Conclusion Electro-poration of HDFCs yield relatively high transfection rates and cell viability when compared to chemical transfection techniques. Our observations might be useful for developing gene and cell therapy applications using dental follicle stem cells. © 2009 Springer Science+Business Media, LLC.

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Keywords

Cell therapy, Electro-poration, Flow cytometry, Gene therapy, Human dental follicle cells, Mesenchymal stem cells, Transfection